IN THE CLAIMS:

Please cancel claims 2, 13, and 20 without prejudice and amend the claims as follows:

1. (Currently Amended) A method for forming a cap layer, comprising:
depositing a barrier layer in a feature in a dielectric layer of a substrate;
filling the feature with a metal-containing layer;
planarizing the substrate; and
depositing a refractory metal nitride cap layer on the substrate by a cyclical deposition process comprising alternately pulsing a metal-containing compound and a nitrogen-containing compound to deposit the refractory metal nitride cap layer.

2. (Canceled)

3. (Currently Amended) The method of claim [[2]] 1, wherein the refractory metal nitride cap layer comprises tantalum nitride.

4. (Currently Amended) The method of claim [[2]] 1, wherein the pulsing is continued until the refractory metal nitride cap layer has a crystalline like structure over the metal-containing layer.

5. (Currently Amended) The method of claim [[2]] 1, wherein the pulsing occurs at a pressure between about 0.5 Torr and about 5 Torr at a temperature between about 150°C and about 350°C.

6. (Currently Amended) The method of claim [[2]] 1, wherein the pulsing is repeated until the refractory metal nitride cap layer has a thickness of about 10 angstroms.

7. (Currently Amended) The method of claim [[2]] 1, wherein the pulsing is repeated until the refractory metal nitride cap layer has a thickness of from about 5 angstroms to about 20 angstroms.

8. (Currently Amended) The method of claim [[2]] 1, further comprising flowing a non-reactive gas continuously during the pulsing of the metal-containing compound and the pulsing of the nitrogen-containing compound.

9. (Currently Amended) The method of claim [[2]] 1, wherein the pulsing of the metal-containing compound and the pulsing of the nitrogen-containing compound are separated by a time delay.

10. (Currently Amended) The method of claim 1, wherein the refractory metal nitride cap layer has a thickness sufficient to block diffusion of metal atoms from the metal-containing layer.

11. (Currently Amended) The method of claim 1, further comprising depositing an etch stop layer on the refractory metal nitride cap layer.

12. (Currently Amended) A method for processing a substrate, comprising:

depositing a barrier layer in a feature in a dielectric layer of a substrate;

filling the feature with a metal-containing layer;

planarizing the substrate;

depositing a cap layer comprising tantalum nitride on the substrate by a cyclical deposition process comprising alternately pulsing a tantalum-containing compound and a nitrogen-containing compound to deposit the cap layer; and

depositing an etch stop layer on the cap layer.

13. (Canceled)

14. (Currently Amended) The method of claim [[13]] 12, wherein the pulsing is continued until the cap layer has a crystalline like structure over the metal-containing layer.

15. (Currently Amended) The method of claim [[13]] 12, wherein the pulsing is repeated until the cap layer has a thickness of from about 5 angstroms to about 20 angstroms.

16. (Currently Amended) The method of claim [[13]] 12, further comprising flowing a non-reactive gas continuously during the pulsing of the tantalum-containing compound and the pulsing of the nitrogen-containing compound.

17. (Currently Amended) The method of claim [[13]] 12, wherein the pulsing of the tantalum-containing compound and the pulsing of the nitrogen-containing compound are separated by a time delay.

18. (Original) The method of claim 12, wherein the cap layer has a thickness sufficient to block diffusion of metal atoms from the metal-containing layer.

19. (Currently Amended) A method of forming a dual damascene structure, comprising:

depositing a first dielectric film on a substrate;

depositing an etch stop on the first dielectric film;

pattern etching the etch stop to define a vertical interconnect opening and expose the first dielectric film;

depositing a second dielectric film on the etch stop and the exposed first dielectric film;

pattern etching the second dielectric film to define a horizontal interconnect and continuing to etch the exposed first dielectric film to define the vertical interconnect;

depositing a barrier layer on the substrate;

depositing a metal-containing layer on the substrate to fill the vertical interconnect and the horizontal interconnect;

planarizing the ~~substrate~~ metal-containing layer and the second dielectric film;

depositing a refractory metal nitride cap layer on the planarized metal-containing layer and the planarized second dielectric film ~~substrate~~ by a cyclical deposition process comprising alternately pulsing a metal-containing compound and a nitrogen-containing compound to deposit the refractory metal nitride cap layer; and

depositing an etch stop layer on the refractory metal nitride cap layer.

20. (Canceled)

21. (Currently Amended) The method of claim [[20]] 19, wherein the refractory metal nitride cap layer comprises tantalum nitride.

22. (Currently Amended) The method of claim [[20]] 19, wherein the pulsing is continued until the refractory metal nitride cap layer has a crystalline like structure over the metal-containing layer.

23. (Currently Amended) The method of claim [[20]] 19, wherein the pulsing is repeated until the refractory metal nitride cap layer has a thickness of from about 5 angstroms to about 20 angstroms.

24. (Currently Amended) The method of claim [[20]] 19, further comprising flowing a non-reactive gas continuously during the pulsing of the metal-containing compound and the pulsing of the nitrogen-containing compound.

25. (Currently Amended) The method of claim [[20]] 19, wherein the pulsing of the metal-containing compound and the pulsing of nitrogen-containing compound are separated by a time delay.

26. (Currently Amended) The method of claim 19, wherein the refractory metal nitride cap layer has a thickness sufficient to block diffusion of metal atoms from the metal-containing layer.